



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,373	02/21/2002	Frank Menzel	219209US0X	4933

22850 7590 05/04/2005

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT PAPER NUMBER

1751

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/078,373

Applicant(s)

MENZEL ET AL.

Examiner

Kallambella Vijayakumar

Art Unit

1751

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2 Nos.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Detailed Action

- Applicant's arguments with respect to claims 1-23 have been considered but are moot in view of the new ground(s) of rejection.
- The IDS filed 01/26/2005 and 04/08/2005 have been considered by the examiner.

Claim Objections

Claim 14 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The limitation of dispersion energy in claim-1 is not further limiting in claim-14.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-7, 14-16 and 20-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Mangold et al (EP 1048617).

Mangold et al teach an aqueous dispersion of pyrogenically produced Si-Al-mixed oxide containing 1-99.999 wt% alumina, and the mixed oxide had a surface area between 5-300 m²/g and a primary crystallite size of 1-200 nm that meets the limitation of claims 1, 3, 6-7 and 22-23 (Abstract, Claims 1-7). With regard to the product by process limitation in claim-1, that would not be given a patentable weight, because when the reference teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process, the claim is not patentable. See *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) And *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113.

With regard to claim-5, the compositions of the prior art and the instant claims are identical and further more both are made by the same process and have identical utilities, where by identical compositions have identical properties.

With regard to claims 2, 4 and 14-15 the claims are drawn to composition it-self.

With regard to a claims-16 and 20-21, the prior art teaches a process of polishing the electronic component by applying the dispersion over a surface and polishing the surface (claim-7). All the limitations of the instant claims are met.

The reference is anticipatory.

2. Claims 1-7, 14-16 and 20-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Deller et al (US 6,455,455).

The applied reference has a common inventor/assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Duller et al teach an aqueous dispersion of pyrogenically produced Si-Al-mixed oxide containing 1-99.999 wt% alumina, and the mixed oxide had a surface area between 5-300 m²/g and a primary crystallite size of 1-200 nm that meets the limitation of claims 1, 3, 6-7 and 22-23 (Abstract, Claims 1-7).

With regard to claim-5, the compositions of the prior art and the instant claims are identical and further more both are made by the same process and have identical utilities, where by identical compositions have identical properties.

With regard to claims 2, 4 and 14-15 the claims are drawn to composition it-self.

With regard to a claims-16 and 20-21, the prior art teaches a process of polishing the electronic component by applying the dispersion over a surface and polishing the surface (claim-7). All the limitations of the instant claims are met.

The reference is anticipatory.

3. Claims 1-2, 4-5, 7-9, 14-17 and 20-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Pryor (US 6,294,106).

Pryor discloses the composition and making of abrasive slurries comprising mixed inorganic oxides of SiO_2 . Al_2O_3 meets the composition in claims 1 and 6 (Col-3, Ln 50-56). The surface area of the mixed oxide was less than $60 \text{ m}^2/\text{g}$ that meets the limitation of claim- 7 (Col-6, Ln 26-28). The abrasive slurry contained 1-30% by wt. of solids at a pH of 4-6 that meets the limitation of claims 8-9 (Col-7, Ln 11-15, Ln 26-28). The prior art teaches making of the mixed oxide by co-gelling methods and making of the slurries by treating the oxide particles in an autoclave under pressure to control the particle size and surface area thereby controlling the polishing characteristics that meets the surface coating of the particles in claim-5 (Col-5, Ln 35-Col-6, Ln 16). With regard to the argument by the applicants that the prior art does not teach specific embodiments, "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." In re Heck, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983). The prior art further teaches the median particle size of the abrasive mixed-oxide to be 0.1-0.5 microns that meets the limitation of claim 22.

With regard to claims 2, 4 and 14-15 the claims are drawn to composition it-self.

With regard to claims 16-17 and 20-21 the prior art teaches the polishing of a wafer with the slurry (Col-10, Example-5). All the limitations of the instant claims are met.

The reference is anticipatory.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
1. Claims 8-13 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangold et al (EP 1048617) as applied to claim 1 above, and further in view of Minami et al (JP 2000-265161) or Itakura et al (JP 2000-133621) or Naoyuki et al (JP 2000-109810).

The disclosure by Mangold et al on the aqueous dispersion of silica-alumina and methods using dispersions for polishing surfaces as set forth in Rejection-1 under 35 USC 102(b) is herein incorporated.

The prior art fails to teach the concentration of solids in the slurry per claim-8, the pH range per claim 9, the addition of additives per claims 10-13 and a process of polishing the surface per claims 17-19.

In the analogous art Minami et al teach a mixed crystal silica-alumina slurry for polishing surfaces containing 0.5 wt% solids, the benefits of varying the silica to alumina ratio from 1 to 9 and the addition of oxidizing agents, an oxidation retarder, a dispersant and an organic acid to aid the stability of the slurry, and polishing the surface with the slurry at near neutral pH range of 4-9 (Abstract, Para 0029). The prior art further teaches polishing the semiconductor surfaces including aluminum metal and oxide surfaces (Para 0053).

In the analogous art Naoyuki et al teach the benefits of using of amphoteric biodegradable polymers having free COOM groups and/or SO₃M groups and NH₂ groups, where M is H, NH₄, Na or K, in making of oxide based CMP slurries (Abstract).

In the analogous art, Itakura et al teach the benefits of adding peroxides as oxidizing agents, benzotriazoles as corrosion inhibitors and an amino acid to the CMP slurries containing grains of alumina (Abstract).

It would have been obvious to a person of ordinary skill in the art to combine the teachings of Mangold et al with either Minami et al or Itakura et al or Naoyuki et al to benefit from a CMP slurry with operability in neutral pH ranges, and further optimize the composition properties to match the process parameters with reasonable expectation of success because the combined prior art teachings is suggestive of the claimed dispersion and the process.

2. Claims 3, 6, 10-11, 18-19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pryor (US 6,294,106) as applied to claim 1 above, and further in view of either Sakatani et al (US 5,804,513) or Minami et al (JP 2000-265161).

The disclosure by Pryor on the composition and methods using CMP solutions as set forth in Rejection-3 under 35 USC 102(e) herein incorporated.

Pryor does not disclose the composition per claim-3, crystallinity of alumina in the mixed oxide per claim-6, the addition of oxidizers, activators, dispersants and inhibitors in the CMP slurries per claims 10-11, the process of polishing various surfaces per claims 18-19 and the particle size per claim-23.

In the analogous art Minami et al teach a mixed crystal silica-alumina slurry for polishing semiconductor surfaces containing 0.5 wt% solids, and the benefits of varying the silica to alumina ratio from 1 to 9 and addition peroxides as oxidizing agents, an oxidation retarder, a dispersant and an organic acid to aid the stability of the CMP slurry in operational the pH range of 4-9 (Abstract, Para 0029). The prior art further teaches polishing semiconductor surfaces including aluminum surfaces and oxide surfaces with the slurry (Para 0053).

In the analogous art Sakatani et al disclose the predominance of α and γ forms alumina in the CMP slurries (Col-2, Ln: 23-38; Col-5, Ln: 45-51), anchoring of one oxide over the other oxide (Col-3, Ln: 54-65; Col-4, Ln: 38-54), use of oxidizing agents (Col-4, Ln: 3-11), pH of the slurry to be about 7 or less (Col-3, Ln: 61-65) and polishing of metal and oxide layers (Col-9, Ln: 26-31).

It would have been obvious to a person of ordinary skill in the art to combine the teachings of Pryor with either Minami et al or Sakatani et al to benefit from a CMP slurry with operability in neutral pH ranges, and further optimize the elemental ratios and/or particle size and/or the slurry properties to be functional near neutral pH with a reasonable expectation of success because the combined prior art teaching is suggestive of the claimed composition and the polishing process.

3. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pryor (US 6,294,106) as applied to claim 1 above, and further in view of either Kaufmann et al (US 5,783,489) or Cote et al (US 6,375,693).

The disclosure by Pryor on the composition and methods using CMP solutions as in Rejection-3 Under 35 USC 102(e) herein incorporated.

Pryor fails to teach the addition of various additives such as oxidizers, dispersants and inhibitors in the CMP slurries per claims 10-13.

In the analogous art, Kaufmann et al teach the composition of CMP slurries containing grains of fumed aluminum oxide and silica and the benefits of adding organic acids, amphoteric stabilizers, oxidizing agents to the slurry, and polishing of metals and oxides at a pH of 2-8 (Col-4, Ln: 47-65; Col-5, Ln: 21-28, Col-5, Ln-55 to Col-7, Ln-64; Col-9, Example-2, Table-1).

In the analogous art Cote et al teach the addition of BTA (benzotriazole) as corrosion inhibitors and its benefits in the formulation of oxide based CMP slurry and its applications (Abstract, Col-5, Ln: 4-35).

It would have been obvious to a person of ordinary skill in the art to combine the teachings of Pryor with either Kaufmann et al or Cote et al to benefit from a slurry that is stable and functional neutral pH with the reasonable expectation of success because the combined prior art teaching is suggestive of the claimed composition.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

- Claims 1-2, 4, 7, 16 and 22 rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 and 6-7 of U.S. Patent No. 6,455,455. Although the conflicting claims are not identical, they are not patentably distinct from each other as a whole because both the instant application and the patent claim an aqueous dispersion containing Si-Al-oxide with similar compositions and properties that were made by similar process, and a process for polishing, while the instant application differs from the patent wherein it recites a limitation of Si-O-Al bonds and a dispersion using particular energy input.
- Claims 1, 7-9, 13, 21 and 23 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-5 and 9 of copending Application No. 10/354,969. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are drawn to aqueous dispersions with similar composition and properties and made by similar process while the

co-pending application differs from the instant application in claiming, "chemical mechanical polishing" that would have been obvious.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented. The Examiner notes that the copending application with SI # 10/354,969 has been allowed on 02/22/2005.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-

1324. The examiner can normally be reached on M-Th, 07.00 - 16.30 hrs, Alt. Fri: 07.00-15.30 hrs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMV
April 19, 2005.


Mark Kopec
Primary Examiner